KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

NAIROBI SCHOOL SCHOOL

CHEMISTRY

PAPER 1

MARKING SCHEME

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NAIROBI SCHOOL KCSE TRIAL AND PRACTICE EXAM 2016
QUESTION PAPER 1
MARKING SCHEME

1 (a) R : 2.8.6 √ ½mk Q : 2.8.3√ ½mk

(b) $Q_2 R_3$ √ 1mk

Rej: $2Q + 3R \longrightarrow Q_2R_3$

2.

Species	Number of electrons	Number of nutrons
$3He^{2+}$ 2	O ½	1 ½

(b) K^{3-} √ ½mk outer energy level is completely filled with electrons√ ½mk

3. (a) The rate of the forward reaction is higher than that of backward reaction. √ 1mk

(b) (i) More CO_2 and H_2 would be formed. √ ½mk
This involved in increased in volume √½mk /no. of molecules from 2 to 4 molecules.

(ii) Methanol would be produced faster √ ½mk; since the catalyst would establish the equilibrium faster. √ ½mk

(c) Negative/ -ve ½mk Reduction in temperature favours an exothermic reaction√ ½mk

4. (a) $\frac{Tm_2}{TCO_3} = \frac{M\,N_2}{MCO_2}$ $RMM(N_2) = 28$ $RMM(CO_2) = 24$

$280cm^3 = 70secs$

$400cm^3 = \frac{400 \times 70}{280^-} = 100$ sec√ ½mk

$\frac{100}{TCO_2} = \sqrt{\frac{28}{44}}$ √ 1mk $\frac{100}{TCO_2} = 0.7977$

$= 125.36$ sec √ ½mk

5. (a) (i) Lead (II) nitrate / $Pb(NO_3)_2$ √ 1mk

(ii) Lead (II) Oxide√ 1mk / PbO

(iii) Lead (II) hydroxide √1mk / $Pb(OH)_2$

(b) $Pb^{2+}(aq) + 2OH^-(aq) \longrightarrow Pb(OH)_2(s)$ NB unbalanced /wrong formulae √ 0

$Pb(OH)_2(s) + 2OH^-(aq) \longrightarrow [Pb(OH)_4]^{2-}{}_{(aq)}$ Missing/wrong state symbols √ ½ mk

6. (a) A - SO Cl^-

B - HCO^{2-}

- Boiling
- Distillation
- Addition of Na_2Co_3
- Addition of controlled amount of $Ca(OH)_2$

7. (a) They are both metals √ ½mk which they react by losing electrons √ ½mk

(b) $RCO_{3(s)} \longrightarrow RO_{(s)} + CO_{2(g)}$

8. Oxidation of chloride ions

$2Cl^-(aq) \longrightarrow Cl_2(g) + 2e^-$

1 mole of Cl^- ions requires 2 x 96500 √1mk

= 193000 coulombs

Q = 1t

= 0.9 x 30 x 60 √ = 1620 coulombs ½ mk

193000 coulombs = $22.4dm^3$

1620 coulombs = ?

$\frac{1620 \times 22.4}{193000} = 0.1880dm^3$

$= 188cm^3$ √½mk

9. (a) A hydrocarbon which is having either a double or triple bonds between carbon atoms √ 1mk

(b) Bubble each gas through ammoniacal silver nitrate solution. √ 1mk

Ethyne forms a yellow precipitate: ethene does not. 1mk

10.

- React dilute HCl with excess iron powder √½mk
- Filter to remove unreacted iron √½mk
- To the filtrate add aqueous Na_2CO_3 √½mk or K_2CO_3 or $(NH_4)CO_2$ √½mk
- Filter √½mk
- Wash the residue with distilled water. √½mk
- Dry in the sun √½mk / between filter papers/ heat to dry

11. (a) $H_2S_{(g)} + Cl_{2(g)} \longrightarrow S_{(s)} + 2HCl_{(g)}$

ON H = +2 $ONCl_2$ = O ON:H=+2 NB: Each mark is tied to the statements

S = -2 Cl^- = -2 √½mk

ON of S increased from -2 to O. (oxidation)

ON of Cl_2 reduced from 0 to -2 (reduction)

Chlorine Cl_2 is oxidising agent √½mk (***Each mark is tied to the statements.)***

(b) Expected volume of HCl = 2 x 70 = $140cm^3$√1mk

% yield = $\frac{80}{140}$ x 100 √½mk

= 55.71% √ ½ mk

12. (a) (i) $A_{(s)} / A^{2+} // ½ E_{(g)} E^-_{(aq)}$

(ii) 2.87 – -27.90

= 5.77 V

13. (a) (i) Galena √½mk

Air √½mk

(ii) Roasting √ 1mk

(b) Sulphur oxide produced lead to

- Formation of acid rain √½mk
- Stunted plants √½mk Any 2 for 2 x ½ mk= 1mk
- Irritation of the respiratory system √½mk

14. Add cold water to the mixture and stir. K dissolves √½mk

- Filter to obtain L and M as the residue. √½mk
- Evaporate the filtrate to dryness to obtain K √½mk
- Add water to the residue and heat to boiling. M dissolves √½mk
- Filter while hot and dry the residue to obtain L √½mk.
- Evaporate the filtrate to dryness to obtain M. √½mk

15. (a) Experiment carried out in fume chamber √½mk open air since chlorine is poisonous

NB: ½mk tied to the explanation.

(b) MnO_2 √½mk

(c) For air to be removed √½mk in the combustion tube which would oxidize aluminium foil to aluminium oxide. √½mk

(d) (i) $2Al + 3Cl_2 \longrightarrow 2AlCl_3$ √½mk

Mole ratio 2 : 3 : 2

Moles of Al = $\frac{1.08}{27}$ = 0.04 moles √½mk

Mass = 0.04 x 133.5 √½mk = 5.3g √½mk

(ii) $\frac{3.47}{5.34}$ x 100 = 64.98 √½mk

16. (i) Separating funnel √½mk

(ii) To dissolve iodine hence separating it from sodium Chloride. √1mk

(iii) A mixture of iodine and methylbenzene. √½mk

N.B: The two must be stated to earn √½mk

17. Propen – 1-ol has hydrogen bonds √½mk and Van der waals forces while pentane had only van der waals force.√ ½mk

18. (a) (i) For smooth boiling /prevent spurting √1mk

(ii) Increase surface area for condensation √1mk

(b) - Extraction of oil from nuts seeds √1mk
- Extraction of natural dyes from plants
- Extraction of caffeine from tea & coffee
- Extraction of herbal medicines from plants

Any 2 =2mks

19. Mole ratio H+ : OH = 12

Conc of NaOH = 8/40 = 0.2m √½mk

Moles of sodium reacted = $\frac{0.02 \times 20}{1000}$ = 0.004 = 0.002moles √½mk

Moles of acid reacted = ½ x 0.004 = 0.002 moles √½mk

0.002 moles ⇒ 0.18 √½mk

1 mole = $\frac{1 \times 0.18}{0.002}$ √½mk = 90 √½mk

20. Gas X – Carbon (iv) oxide /CO√½mk

GasY – Carbon (iv) oxide / CO_2√½mk

21. (a) Perspex / Polymethylacrylate √1mk

(b) Manufacture of – Plastic lens √1mk
- Wind screens
- Safety screen

22. First the red litmus paper changed to blue and then to red. √ 1mk

Ammonium chloridr decomposes to give ammonia and hydrogen chloride gas √ ½mk

Ammonia diffuses faster than hydrogen chloride since it is less dense, √ ½mk changing red litmus paper to blue, √ ½mk

HCl then changed blue to red litmus paper √ ½mk

23. (a) Impure √ 1mk

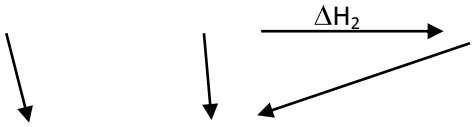
It condensed and freezed √ 1mk over arrange of temperatures

Rej: Melting point/boiling point

(b) Particles of the substance in gaseous form are losing kinetic √ ½mk and come closer to one another, developing stronger interparticle forces of attraction. √ ½mk

24. (a) Weak alkali is the one that does not ionize completely in solution √½mk /less OH^- ions while strong alkali is the one that undergoes complete ionization / many OH- ions √ ½mk

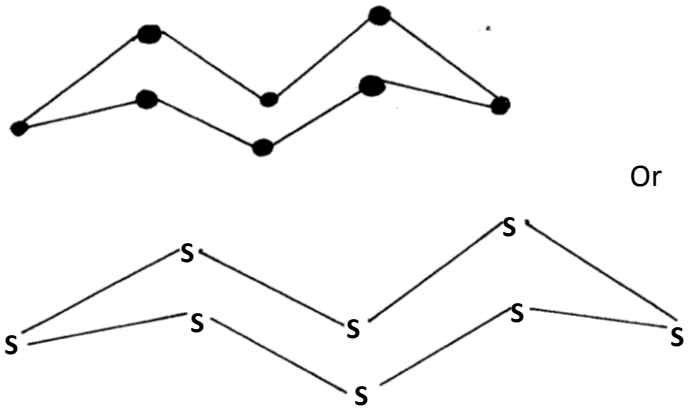
(b) (i) Z, (ii) M



25. (a) $4C_{(s)} + 5H_{2(g)} \rightarrow C_4H_{10(g)}$
ΔH_1 $4O_2$ $^5/_2\,O_2$ ΔH_3 $^{13}/_2\,O_2$ √ 1mk
4 CO2 + 5H2O
NB: Every atom must balance.

(b) $\Delta H_1 = \Delta H_2 + \Delta H_3$
$\Delta H_1 = (-393 \times 4) + -265 \times 5$
$[-393 \times 4 + (-286 \times 5)] = \Delta H_2 + (-2877)$
$\Delta H_2 = -125$ kJ/Mol
Penalize √ ½mk for wrong sing /units

26. (a)



(b) Sulphur is made up of S_8 ring √ ½mk. On heating, van der waal forces of attraction are broken √ ½mk and the molecules become free.
On further heating, the rings open up to form long chains. (S - chains) which entangle√ 1mk making the liquid less viscous

27. (a) $NH_3(g)$: √½mk It accepted / gained a proton from H_2O to form NH^+_4 √½mk

(b) More NH_3 and H_2O would be formed. √ 1mk
Adding NaOH(aq) increases the concentration of OH- ions, √ ½mk
NH^+_4 would react with increased OH- ions to form NH3 and H2O √ ½mk

28. (a) Ammonia gas

(b) (i) Filtration/crystallization/precipitation √1mk
(ii) Decomposition √1mk

(c) $2\,NaHCO_{3(s)} \longrightarrow Na_2CO_3(s) + CO_{2(g)} + H_2O_{(l)}$